TRC

Customer-Focused Solutions

July 11, 2005

California Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, California 90013

ATTN: MR. JIMMIE WOO

SITE: FORMER 76 STATION 0353
200 SOUTH CENTRAL AVENUE
GLENDALE, CALIFORNIA
LARWQCB FILE NO. 912040107

RE: REMEDIAL ACTION PLAN

Dear Mr. Woo:

On behalf of ConocoPhillips Company, TRC submits this remedial action plan (RAP) for former 76 Station 0353, located at 200 South Central Avenue in Glendale, California. This site has been included in the Los Angeles Regional Water Quality Control Board (LARWQCB) Expedited Agency Oversight Program (EAOP). Therefore, ConocoPhillips Company will implement the scope work detailed in this RAP approximately 60 days from July 11, 2005 unless otherwise directed in writing by the LARWQCB. If you have any questions regarding this project, please call me at (949) 753-0101, or Ms. Shari London with ConocoPhillips Company at (714) 428-7720.

Sincerely,

TRC

John Nordenstam, RG
Senior Project Geologist

Enclosure

cc: Ms. Shari London, ConocoPhillips Company (electronic copy only)
Mr. Peter Hayden, Caruso Affiliated (electronic copy only)
Mr. Mark Berry, Department of Development Services, City of Glendale (electronic copy only)

200948/0353R01.RAP

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TRC

Customer-Focused Solutions

REMEDIAL ACTION PLAN

July 11, 2005

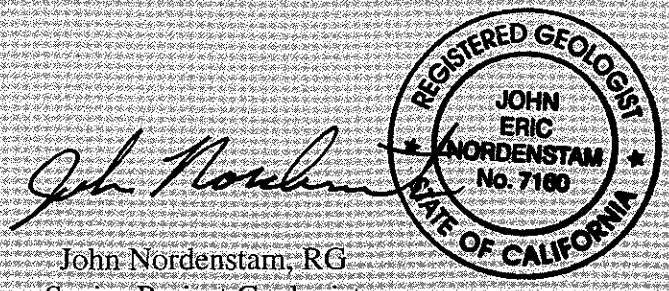
FORMER 76 STATION 0353
200 South Central Avenue
Glendale, California

TRC Project No. 20-0948

Prepared For:

ConocoPhillips Company
P.O. Box 25376
Santa Ana, California

By:



John Nordenstam, RG
Senior Project Geologist

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1.0 INTRODUCTION

TRC submits this remedial action plan (RAP) for former 76 Station 0353, located at 200 South Central Avenue in Glendale, California (see Figure 1).

1.1 OBJECTIVE

The objective of this report is to present the results of site assessment and feasibility testing activities and to propose an appropriate remedial action. The primary goal of the proposed remedial action is to reduce petroleum hydrocarbon concentrations beneath the site in order to minimize the threat to underlying usable aquifers.

1.2 SITE DESCRIPTION

Present Site Use: The site is an inactive service station located on the southeast corner of South Central Avenue and West Harvard Street. The site is currently fenced and is not in use. The station maintains two 20,000-gallon gasoline underground storage tanks (USTs), one 550-gallon waste oil UST, five dispenser islands, associated product lines, two hydraulic hoists, and one clarifier (see Figure 2).

Future Site Use: The City of Glendale acquired the property from ConocoPhillips through condemnation proceedings. The City of Glendale Redevelopment Agency is planning on redeveloping the site with a mix of retail and residential uses.

Adjacent Properties: The Glendale Galleria Shopping Center is located west of the site. The properties north, east and south of the site are part of the planned redevelopment and are currently vacant.

Geography: The site is located within the southeastern portion of the San Fernando Valley between the eastern end of the Santa Monica Mountains (approximately 1 mile to the west of the site) and the Verdugo Mountains (approximately 1.5 miles east of the site). Interstate 5 and the Los Angeles River (in a concrete lined channel) are located approximately 1 mile west of the site. Verdugo Wash is located approximately 1 mile north of the site. The site is located at an elevation of approximately 517 feet above mean sea level (NGVD-1929). The topography in the area slopes gently to the southwest (United States Geological Survey, 1966).

Regional Geology/ Hydrogeology:

The site is located within the Upper Los Angeles River Area (ULARA). The ULARA encompasses all the watershed of the Los Angeles River and its tributaries above a point in the river designated as Los Angeles County Department of Public Works (LACDPW) Gauging Station F-57C-R, near the junction of the Los Angeles River and the Arroyo Seco. The ULARA is bounded on the north and northwest by the Santa Susana Mountains; on the north and northeast by the San Gabriel Mountains; on the east by the San Rafael Hills, which separate it from the San Gabriel Basin; on the south by the Santa Monica Mountains, which separate it from the Los Angeles Coastal Plain; and on the west by the Simi Hills (ULARA Watermaster, 2003).

The ULARA has four distinct groundwater basins. The water supplies of these basins are separate and are replenished by deep percolation from rainfall, surface runoff and from a portion of the water that is delivered for use within these basins. The four groundwater basins in the ULARA are the San Fernando, Sylmar, Verdugo, and Eagle Rock Basins (ULARA Watermaster, 2003).

The site is located within the southeastern portion of the San Fernando Basin. The San Fernando Basin is the largest of the four groundwater basins within the ULARA. It is bounded on the east and northeast by the San Rafael Hills, Verdugo Mountains, and the San Gabriel Mountains; on the north by the San Gabriel Mountains and the eroded south limb of the Little Tujunga Syncline which separates it from the Sylmar Basin; on the northwest and west by the Santa Susana Mountains and the Simi Hills; and on the south by the Santa Monica Mountains (ULARA Watermaster, 2003).

Regional groundwater in the area of the site occurs in Quaternary alluvial deposits consisting primarily of sand and gravels with localized, interbedded lenses of silt and clay. The alluvium overlies sandstone and conglomerates of the Topanga Formation (Department of Water and Power, 1983). The regional groundwater flow in the area of the site is directed toward the southwest (ULARA Watermaster, 2003).

The site is located within the Crystal Springs Well Field. The Crystal Springs Well Field is on the Federal National Priority List (NPL) as a Federal Superfund site due to the presence of chlorinated hydrocarbons in the groundwater (City of Glendale-Water Section, 1993). Although the site is located within the Crystal Springs Well Field NPL Superfund site, the actual chlorinated solvent plume in Glendale is limited to areas along San Fernando Road and west of San Fernando Road, approximately 3,500 feet west of the site (ULARA Watermaster, 2003). A groundwater extraction and treatment facility was constructed in October 1999 to remediate contaminated groundwater within the Crystal Springs Well Field (City of Glendale-Water Section, 1993).

1.3 PREVIOUS INVESTIGATIONS

In July 1994, two 10,000-gallon gasoline USTs and one 550-gallon waste oil UST were excavated and removed from the site. Eight soil samples (BT-1 through BT-8) were collected from the gasoline UST excavation at approximately 16 feet below grade (fbg) Two soil samples (BT-9 and BT-10) were collected from the waste oil UST excavation at approximately 9 fbg. Six soil samples (DI-1 through DI-6) were collected from beneath the former dispensers at approximately 3 fbg. Two soil samples (PL-1 and PL-2) were collected from beneath the former product lines at approximately 3 fbg (Emcon, 1996).

Concentrations of total petroleum hydrocarbons as gasoline (TPH-G) of 998 and 1,295 milligrams per kilogram (mg/kg) were detected in Soil Samples BT-4 and BT-8, respectively, collected from the eastern portion of the gasoline UST excavation. No detectable concentrations of TPH-G; total recoverable petroleum hydrocarbons (TRPH); benzene, toluene, ethylbenzene, or total xylenes (BTEX) were present in Soil Samples BT-9 and BT-10 collected from the waste oil UST excavation. A TPH-G concentration of 4,562 mg/kg was detected in Soil Sample DI-6 collected from the eastern portion of the eastern dispenser island. No detectable concentrations of TPH-G or BTEX were present in Soil Sample PL-1 collected from the beneath the product lines. Concentrations of 0.009 and 0.011 mg/kg of toluene and total xylenes, respectively, were detected in Soil Sample PL-2; no detectable concentrations of TPH-G, benzene, or ethylbenzene were present in this sample (Emcon, 1996).

Based on the results of laboratory analysis of soil samples collected during UST removal activities, the eastern portion of the eastern dispenser island and the eastern portion of the gasoline UST excavation were over excavated to depths of approximately 7 and 20 fbg, respectively. Two soil samples (BT-4A and BT-8A) were collected from the gasoline UST over excavation and one soil sample (DI-6A) was collected from the dispenser island over excavation. No detectable

concentration of TPH-G was present in Soil Sample BT-4A. Detectable TPH-G concentrations of 683 and 3,458 mg/kg were present in Soil Samples BT-8A and DI-6A, respectively (Emcon, 1996).

Following soil sampling and over excavation activities, two 20,000-gallon gasoline USTs were installed in the same area as the former gasoline USTs (oriented north-south vs. east-west orientation of former gasoline USTs) and a 550-gallon waste oil UST was installed at the same location as the former waste oil UST (Emcon, 1996).

In March 1995, six borings (E-1 through E-6 and E-1A) were drilled in the vicinity of the gasoline USTs and the eastern dispenser island. Boring E-1 was drilled through a conductor casing installed in the eastern portion of the gasoline UST excavation. Boring E-1 was only drilled to a total depth of approximately 25 fbg due to auger refusal. Borings E-1A, E-1, and E-2 were converted to vapor extraction wells. Groundwater was not encountered during this investigation (maximum depth of investigation approximately 73.5 fbg). A maximum TPH-G concentration of 2,800 mg/kg was detected in the soil sample collected from Boring E-1 at approximately 25 fbg. A maximum TPH-G concentration of 940 mg/kg was detected in the soil sample collected from Boring E-1A at approximately 51 fbg. Concentrations of TPH-G ranging from non-detect to less than 2 mg/kg were detected in soil samples collected from Borings E-2 through E-5 (Emcon, 1996).

In April 1995, a vapor extraction test was conducted at the site using Vapor Wells E-1A, E-1, and E-2. Flow rates ranging from approximately 19.8 to 39.5 standard cubic feet per minute (scfm) and vacuum ranging from approximately 2.1 to 13 inches of water were observed during testing activities. Concentrations of TPH-G ranging from 2,700 to 19,000 parts per million by volume (ppmv) were detected in vapor samples collected from Wells E-1, E-1A, and E-2. Based on the results of the testing activities, the estimated radius of influence (ERI) ranged from approximately 28 to 32 feet (Emcon, 1996).

In May 1998, the City of Glendale Fire Department issued site closure based on the designation of the property as a "low risk" site.

In February 2004, at the request of the Glendale Redevelopment Agency, six borings (B1 through B6) and 48 direct-push borings (GP-1 through GP-48) were drilled and sampled at the site. Groundwater was encountered at approximately 105 fbg during soil sampling activities. Maximum TPH-G and benzene concentrations of 24,300 and 75.3 mg/kg, respectively, were detected in the soil sample collected from Boring B1 at approximately 55 fbg. A maximum methyl tertiary butyl ether (MTBE) concentration of 0.646 mg/kg was detected in the soil sample collected from Boring B4 at approximately 55 fbg. A maximum tertiary butyl alcohol (TBA) concentration of 0.181 mg/kg was detected in the soil sample collected from Boring B3 at approximately 55 fbg. In addition, four shallow (less than 10 feet deep) and two deeper (up to approximately 15 feet deep),

diesel/heavy-end hydrocarbon soil plumes were detected in the southern portion of the site (EP Associates, 2004a).

In August 2004, Monitoring Wells MW-1 through MW-5 were drilled and installed. Groundwater was encountered at approximately 100 fbg during well installation activities. A maximum TPH-G concentration of 2,200 mg/kg was detected in the soil sample collected from Monitoring Well MW-3 at approximately 75 fbg. Maximum MTBE and TBA concentrations of 0.391 and 0.610 mg/kg, respectively, were detected in the soil sample collected from Monitoring Well MW-1 at approximately 55 fbg (EP Associates, 2004b).

A quarterly fluid level monitoring and groundwater sampling program was initiated in September 2004 and continues to date (TRC, 2005).

In December 2004, Monitoring Wells MW-6 through MW-9 were drilled and installed. Groundwater was encountered at approximately 102.5 to 105 fbg during well installation activities. One soil sample was collected from each monitoring well at approximately 105 fbg. No detectable concentrations of TPH-G, TPH as diesel (TPH-D), BTEX, MTBE, di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), TBA, or volatile organic compounds (VOCs) were present in the soil samples collected from Monitoring Wells MW-6 through MW-9 at approximately 105 fbg (EP Associates, 2005).

Copies of selected tables and figures from previous investigations are included in Appendix A.

2.0 PRESENT SITE CONDITIONS

2.1 SOIL

Soil types encountered beneath the site consist of sand to gravelly sand and sandy gravel with interbedded layers of silty and clayey sand to a total depth of approximately 130 fbg (maximum depth of investigation). Refer to Appendix A for copies of cross sections from previous investigations

Gasoline range hydrocarbon-affected soil is present in the vicinity of the gasoline USTs and the eastern portion of the eastern dispenser island. Hydrocarbon-affected soil in the gasoline USTs and eastern dispenser island was previously excavated to depths of approximately 7 and 20 fbg, respectively. Maximum TPH-G, benzene, and MTBE concentrations of 24,300, 75.3, and 0.646 mg/kg, respectively, have been detected soil samples collected from the gasoline UST area. Maximum TPH-G and benzene concentrations of 3,458 and 4.369 mg/kg, respectively, have been detected soil samples collected from the area of the eastern dispenser. It appears that the

lateral and vertical extent of adsorbed-phase hydrocarbons in the vicinity of the gasoline USTs and eastern dispenser island have been adequately assessed (see Figure 3). Copies of selected tables and figures from previous investigations are included in Appendix A.

Diesel/heavy end hydrocarbon-affected soil is present in the shallow subsurface in the southern portion of the site. A total of four shallow (less than 10 feet deep) and two deeper (up to approximately 15 feet deep), diesel/heavy-end hydrocarbon soil plumes are present in the southern portion of the site. The total volume of the diesel/heavy end hydrocarbon-affected soil is estimated at approximately 304 cubic yards. Refer to Appendix A for figures from previous investigations showing estimated extent of diesel/heavy end hydrocarbon-affected soil present in the southern portion of the site.

2.2 GROUNDWATER

Based on fluid level monitoring and groundwater sampling activities conducted in May 2005:

- Groundwater is present beneath the site at depths ranging from approximately 99.68 to 101.85 fbg. The groundwater gradient is approximately 0.01 foot per foot and is directed toward the northwest and west (TRC, 2005).

- No liquid-phase hydrocarbons have been observed in the monitoring wells installed at the site (TRC, 2005).

- Detectable total purgeable petroleum hydrocarbon (TPPH) concentrations of 92, 89 and 85 micrograms per liter (ug/L) were present in groundwater samples collected from Monitoring Wells MW-6, MW-7 and MW-8, respectively. A J-Flag TPPH concentration (between the practical quantification limit and the method detection limit) of 32 ug/L was detected in the groundwater sample collected from Monitoring Well MW-3 (TRC, 2005).

- Detectable benzene concentrations of 2.5, 4.1, and 2.5 ug/L were present in groundwater samples collected from Monitoring Wells MW-6, MW-8, and MW-9, respectively (TRC, 2005).

- A detectable MTBE concentration of 21 ug/L was present in the groundwater sample collected from Monitoring Well MW-3. J-Flag MTBE concentrations ranging from 0.16 to 0.57 ug/L were detected in groundwater samples collected from Monitoring Wells, MW-1, MW-2, MW-4, MW-5, MW-7, and MW-8 (TRC, 2005).

- No detectable TBA concentrations were present in groundwater samples collected from Monitoring Wells MW-1 through MW-9 (TRC, 2005).

- It appears that the lateral extent of dissolved-phase hydrocarbons present in the groundwater beneath the site is adequately assessed in all directions.

Refer to Appendix A for figures and tables summarizing fluid level monitoring and groundwater sampling data.

3.0 OVERVIEW OF FEASIBLE REMEDIAL ACTION

Various remedial technologies for remediation of hydrocarbon-affected soil and groundwater present beneath the site were reviewed. The following criteria were considered while selecting a remedy:

- Technical analysis for effectiveness, practicality, and reliability.
- Ability to remove petroleum hydrocarbons from the subsurface.
- Economic considerations including anticipated time to reach desired cleanup levels.
- Site-specific conditions such as depth and types of contamination present beneath the site, soil properties, and soil stratigraphy.

Advantages and disadvantages, limitations, and regulatory and economic concerns for several feasible remediation alternatives (passive remediation/risk assessment, excavation and disposal/treatment, and vapor extraction) are discussed in Appendix B.

Based on the current site conditions and the proposed future site use, TRC recommends the following remedial approach:

- Abandon Monitoring Wells MW-1 and MW-3 by over drilling to facilitate the removal of the gasoline USTs (see Figure 2).

- Conduct site demolition activities. The gasoline USTs, waste oil UST, dispensers, product lines, hoists and clarifier will be removed from the site under the oversight of the City of Glendale Fire Department.

- Conduct remedial excavation of shallow hydrocarbon-affected soil detected (if any) in the areas of the dispensers, product lines, waste oil UST, hoists, and clarifier during site demolition activities.

- Install 2 groundwater monitoring wells (MW-1A and MW-3A) to replace Monitoring Wells MW-1 and MW-3 (removed to facilitate UST removal activities) (see Figure 4).

- Install 9 vapor extraction wells to facilitate the remediation of hydrocarbon-affected soil present in the vicinity of the gasoline USTs (see Figure 4).

- Install 8 soil gas probes and prepare a health based risk assessment of the site to determine site specific closure criteria (see Figure 5).

- Conduct vapor extraction activities to remediate hydrocarbon-affected soil present in the vicinity of the gasoline USTs prior to redevelopment activities (see Figure 4).

- Drill 6 confirmation borings to confirm remediation of hydrocarbon-affected soil present in the vicinity of the gasoline USTs (see Figure 6).

- Conduct remedial excavation of diesel and heavy-end hydrocarbon-affected soil present in the southern portion of the site during excavation activities to be conducted as part of redevelopment activities. The area of the site will be excavated to approximately 15 fbg for a subterranean parking structure during redevelopment activities.

- Continue quarterly fluid level monitoring and groundwater sampling for 1 year. Based on the current dissolved-phase hydrocarbon concentrations detected in the groundwater beneath site, it appears a risk-based closure with no remediation of the groundwater may be acceptable.

4.0 PLANNED REMEDIAL ACTION

This site has been included in the LARWQCB Expedited Agency Oversight Program (EAOP). Therefore, ConocoPhillips Company will implement the scope work detailed in this section of the report within 60 days from the date of this report unless otherwise directed in writing by the LARWQCB. ConcoPhillips Company will submit a written notice stating its intent to proceed with the cleanup activities to the LARWQCB. The notice of intent will include: the date when the proposed remediation activities will commence, the estimated date when remediation

activities will be completed, and the estimated date when the final closure request will be submitted to the LARWQCB.

For each of the scopes of work detailed below:

- The licensed professional in responsible charge will supervise all work associated with the project within the purview of the professional as defined in the Geologist and Geophysicists Act of the California Code of Regulations.

- The site will be marked with white spray paint and Underground Service Alert (USA) will be notified. The owners of underground utilities in the area of the site will be notified by USA and the utilities present in the area of the site will be marked.

- The LARWQCB, City of Glendale, and ConocoPhillips Company will be notified at least 48 hours prior to the commencement of each phase of fieldwork.

4.1 WELL ABANDONMENT

In order to facilitate removal of the gasoline USTs, Monitoring Wells MW-1 and MW-3 will be abandoned (see Figure 2). Monitoring Wells MW-1 and MW-3 will be abandoned by overdrilling which will effectively remove all materials within the existing borehole including the well casing, annular seal, and filter pack materials. The wells will be overdrilled with10-inch-diameter, hollow stem auger to the total depth of each well. The resulting borehole will be backfilled with volclay grout to within approximately 5 feet of grade, the remaining 3 feet of the borehole will be backfilled with bentonite chips and capped with approximately 2 feet of concrete. All well abandonment activities will be conducted in accordance with California Department of Water Resources Bulletin 74-90: California Well Standards.

Soil generated during well abandonment activities will be temporarily stored onsite in a 15 yard, closed top, roll-off bin prior to transport to an appropriate facility for disposal/recycling. Fluids generated during well abandonment activities will be temporarily stored onsite in Department of Transportation (DOT) approved 55-gallons drums prior to transport to an appropriate facility for disposal/recycling.

A report summarizing well abandonment activities will be prepared following completion of field activities.

4.2 SITE DEMOLTION / UST REMOVAL

The existing site improvements will be removed in preparation of site redevelopment activities. The gasoline USTs, waste oil UST, dispensers, product lines, hoists and clarifier will be removed from the site under the jurisdiction of the City of Glendale Fire Department (see Figure 2). Excavation activities will be conducted in accordance with a South Coast Air Quality Management District (SCAQMD) Rule 1166 Contaminated Soil Mitigation Plan. Hydrocarbon-affected soil generated during UST removal activities will be stockpiled on, and covered with plastic sheeting or placed in closed top roll-off bins prior to transport to an appropriate facility for disposal/recycling. Soil sampling activities will be conducted under the direction and oversight of the City of Glendale Fire Department. Shallow hydrocarbon-affected soil detected (if any) in the areas of the dispensers, product lines, waste oil UST, hoists, and clarifier will be excavated and removed from the site during site demolition activities.

A report summarizing UST removal, soil sampling and excavation activities will be prepared following completion of field and laboratory activities. Refer to Appendix C for a description of general field procedures.

4.3 MONITORING AND VAPOR WELL INSTALLATION

Two groundwater monitoring wells (MW-1A and MW-3A) will be installed to replace abandoned Monitoring Wells MW-1 and MW-3. In addition, a total of 9 vapor extraction wells (VW-1A,B,C through VW-3A,B,C) will be installed to facilitate remediation of hydrocarbon-affected soil present in the area of the former gasoline USTs (see Figure 4).

The proposed monitoring wells will be installed to a total depth of approximately 115 fbg using 10-inch-diameter hollow stem augers. The proposed vapor extraction wells will be installed to total depths ranging from approximately 40 to 90 fbg using 10-inch-diameter hollow stem augers. Soil samples will be collected from the wells at 5-foot intervals for soil description, field hydrocarbon vapor testing, and laboratory analysis. Soil samples selected for laboratory analysis will be collected in accordance with EPA Method 5035. Soil samples will be analyzed for the following:

- TPH-G using EPA Method 8260B.
- BTEX using EPA Method 8260B.
- MTBE, DIPE, ETBE, TAME, TBA, and ethanol using EPA Method 8260B.

A state-certified laboratory will perform all laboratory analyses. Chain of custody protocol will be followed for all samples, thus providing a continuous record of sample possession prior to actual analysis.

The monitoring wells will be installed to a total depth of approximately 115 fbg with a proposed screened interval extending from approximately 90 to 115 fbg. The actual screen interval will be selected based on field observations. The monitoring wells will be constructed with 4-inch-diameter, Schedule 40 PVC blank casing and well screen with 0.020-inch slotting. Filter pack material will consist of No. 3 Monterey sand. The monitoring wells will be developed by surging and bailing. A California-licensed land surveyor will survey the monitoring wells to a benchmark of known elevation.

The vapor wells will be installed to total depths ranging from approximately 40 to 90 fbg with proposed screened intervals extending from approximately 20 to 40 fbg (Zone A), 45 to 65 fbg (Zone B), and 70 to 90 fbg (Zone C). The actual screen intervals will be selected based on field observations. The vapor wells will be constructed with 2-inch-diameter, Schedule 40 PVC blank casing and well screen with 0.020-inch slotting. Vapor Wells with screen intervals installed in Zones B and C will be nested within the same borehole. Filter pack material will consist of No. 3 Monterey sand.

Soil generated during well installation activities will be temporarily stored onsite in a 15 yard, closed top, roll-off bin prior to transport to an appropriate facility for disposal/recycling. Fluids generated during well installation activities will be temporarily stored onsite in DOT-approved, 55-gallons drums prior to transport to an appropriate facility for disposal/recycling. Refer to Appendix C for a description of general field procedures.

A report summarizing soil sampling and well installation activities will be prepared following completion of field and laboratory activities. The report will include boring logs with well construction details, results of laboratory analysis of soil samples, findings, and conclusions.

4.4 RISK ASSESSMENT

Soil vapor probes will be installed and soil vapor samples will be collected for the purpose of conducting a health-based risk assessment for the site. A total of 8 soil vapor probes will be installed using either direct push or hollow stem auger technology. Two clusters of 3 soil vapor points each (SG-1 and SG-2) will be installed in the gasoline UST area and two single probes (SG-3 and SG-4) will be installed near GP-5 and GP-27 in the southern portion of the site (see Figure 5). The soil vapor probe clusters will consist of 3 soil vapor probes installed at depths of approximately 15, 20, and 25 fbg. The single soil vapor probes will be installed to a depth of approximately 15 fbg. The soil vapor probes will be constructed with a 6-inch long, stainless

steel, mesh probe set in a filter pack of silica sand. Nylaflow sampling tubing will be installed from the probe to the ground surface. The upper portion of the soil vapor probe borehole will be sealed with hydrated bentonite grout to just below ground surface.

Initial soil vapor samples will be collected a minimum of 1 hour after the installation of the soil probes. If the soil probes are installed using hollow-stem auger, the initial soil vapor samples will be collected a minimum of 48 hours after installation of the soil probes. Final soil vapor samples will be collected after completion of proposed vapor extraction activities. A calibrated flow meter and vacuum gage will be connected to the Nylaflow tubing to measure the vacuum integrity of the soil vapor sampling system prior to sample collection. The volume of vapor purged prior to sample collection will be measured and recorded in the daily field notes. Soil vapors will be purged using an adjustable vacuum pump at approximately 200 cubic centimeters (cc) per minute. Once the required purge volume of vapors is removed from each soil vapor point (approximately three to four purge volumes), a soil vapor sample will be collected in a tedlar bag.

Soil vapor samples will be analyzed for:

- TPH-G using EPA Method TO3.
- BTEX using EPA Method TO14.
- MTBE, DIPE, TAME, ETBE, and TBA using EPA Method TO14.

A state-certified laboratory will perform all laboratory analyses. Chain of custody protocol will be followed for all samples, thus providing a continuous record of sample possession prior to actual analysis.

Soil vapor probe and soil vapor sampling activities will be conducted in accordance with the LARWQCB Interim Guidance for Active Soil Gas Investigation dated February 25, 1997, and the California Department of Toxic Substances Control, Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air dated December 15, 2004.

To evaluate if contaminated soil poses a potential risk to humans associated with the proposed redevelopment of the subject site, a receptor/pathway exposure assessment will be completed, available toxicity data will be reviewed, and the potential risk to humans will be estimated. Risk assessment activities will be conducted in accordance with the California Department of Toxic Substances Control, Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air dated December 15, 2004.

4.5 VAPOR EXTRACTION ACTIVITIES

Vapor extraction will be performed to remediate hydrocarbon-affected soil present in the vicinity of the gasoline USTs. In order to effectively capture the adsorbed-phase hydrocarbons present beneath the site, as many as 11 wells will be utilized. A conservative ERI of approximately 25 feet was used for the initial configuration of the well array. See Figure 4 for the estimated radius of influence for vapor extraction.

The basic components of the remediation system will include the following:

- Eleven wells (VW-1A/B/C, VW-2A/B/C, VW-3A/B/C, MW-1A, and MW-3A) extracting from the subsurface (see Figure 4). The well screen intervals are shown below:

Well ID	Screen Interval
VW-1A	20-40 fbg
VW-1B	45-65 fbg
VW-1C	70-90 fbg
VW-2A	20-40 fbg
VW-2B	45-65 fbg
VW-2C	70-90 fbg
VW-3A	20-40 fbg
VW-3B	45-65 fbg
VW-3C	70-90 fbg
MW-1A	90-115 fbg
MW-3A	90-115 fbg

- Aboveground lateral hoses will be used to connect the extraction wells to a vapor extraction system.

- Vapor extraction activities at the site will be conducted using the TRC Mobile Treatment System (MTS). The MTS unit is a truck mounted soil vapor extraction system that is capable of removing soil vapors from the subsurface at vapor flow rates of up to 313 actual cubic feet per minute (at 18 inches of mercury). A high vacuum blower (total vacuum greater than 394 inches of water or up to 29 inches of mercury) will be utilized to extract soil vapors from wells at the site. Extracted hydrocarbon vapors will be abated using a regulatory permitted propane fired thermal oxidizer. Destruction efficiency for non-methane hydrocarbons is 99%+ calculated as hexane. The operation of the MTS unit will be optimized on a daily basis.

In order to confirm that the proposed vapor extraction well array is sufficient to remediate hydrocarbon-affected soil present in the area of the gasoline USTs, vapor extraction tests will be conducted at startup of remediation activities. The general test procedures will consist of extracting vapors from one well (extraction well) and observing vacuum responses in other wells (observation wells). Separate step-flow-rate test will be performed using Wells VW-1A, VW-1B, VW-1C, and MW-1 as extraction wells (see Figure 6). During the step tests, applied vacuum will be increased in stepwise fashion until stabilization of extraction well flow and vacuum is achieved for each step. Separate constant-flow-rate tests will be performed using Wells VW-1A, VW-1B, VW-1C, and MW-1A (separately) as extraction wells and Wells VW-2A/B/C, VW-3A/B/C, MW-3A, and MW-4 as observation wells (see Figure 4). During the constant-rate tests, extraction well vacuum and flow will be held constant and the test continued until stabilization of vacuum response is achieved in the observation wells.

If vapor extraction testing activities indicate that the proposed vapor extraction array is not sufficient to remediate hydrocarbon-affected soil present in the area of the gasoline USTs, additional vapor extraction wells will be installed using the procedures detailed in Section 4.3 of this report.

During operation of the MTS unit, vapor samples will be collected from individual vapor wells and system influent at system start up, after each week of system operation, and at system shutdown. Vapor samples will be analyzed for:

- TPH-G using EPA Method TO3.
- BTEX using EPA Method TO14.
- MTBE, DIPE, TAME, ETBE, and TBA using EPA Method TO14.

A state-certified laboratory will perform all laboratory analyses. Chain of custody protocol will be followed for all samples, thus providing a continuous record of sample possession prior to actual analysis.

It is anticipated vapor extraction activities will be conducted at the site for approximately 3 months. The vapor extraction unit will be shut down after influent vapor concentrations have become asymptotic. A report summarizing vapor extraction activities will be prepared following completion of vapor extraction activities. The report will include the results of vapor extraction testing activities, results of laboratory analysis of vapor samples, findings, and conclusions.

4.6 CONFIRMATION BORINGS

Following completion of vapor extraction activities, a total of 6 confirmation borings will be drilled in the vicinity of the former gasoline USTs to confirm the remediation of hydrocarbon-affected soil (see Figure 6). The proposed confirmation borings will be drilled to a total depth of approximately 100 fbg using 8-inch-diameter hollow stem augers. Soil samples will be collected from the confirmation borings at 5-foot intervals for soil description, field hydrocarbon vapor testing, and laboratory analysis. Soil samples selected for laboratory analysis will be collected in accordance with EPA Method 5035. Soil samples will be analyzed for the following:

- TPH-G using EPA Method 8260B.
- BTEX using EPA Method 8260B.
- MTBE, DIPE, ETBE, TAME, TBA, and ethanol using EPA Method 8260B.

A state-certified laboratory will perform all laboratory analyses. Chain of custody protocol will be followed for all samples, thus providing a continuous record of sample possession prior to actual analysis.

The confirmation borings will be backfilled with volclay grout to within approximately 5 feet of grade, the remaining 3 feet of the borehole will be backfilled with bentonite chips and capped with approximately 2 feet of concrete.

Soil generated during confirmation borings activities will be temporarily stored onsite in a 15 yard, closed top, roll-off bin prior to transport to an appropriate facility for disposal/recycling. Fluids generated during confirmation boring activities will be temporarily stored onsite in DOT-approved, 55-gallons drums prior to transport to an appropriate facility for disposal/recycling. Refer to Appendix C for a description of general field procedures.

A report summarizing soil sampling activities will be prepared following completion of field and laboratory activities. The report will include boring logs, results of laboratory analysis of soil samples, findings, and conclusions.

4.7 EXCAVATION OF DIESEL / HEAVY-END HYDROCARBON-AFFECTED SOIL

The area of the site will be excavated to approximately 15 fbg for a subterranean parking structure during redevelopment activities. Diesel and heavy-end hydrocarbon-affected soil present in the southern portion of the site will be excavated during redevelopment activities. Excavation and site grading activities will be conducted in accordance with a SCAQMD Rule 1166 Contaminated Soil Mitigation Plan. Hydrocarbon-affected soil generated during excavation and site grading activities will be stockpiled on, and covered with plastic sheeting or placed in closed top roll-off bins prior to transport to an appropriate facility for disposal/recycling. A report summarizing excavation activities will be prepared following completion of field and laboratory activities.

4.8 QUARTERLY MONITORING AND SAMPLING PROGRAM

All onsite and offsite monitoring wells will be gauged and sampled on a quarterly basis though the First Quarter 2006. Fluid level monitoring and groundwater sampling activities will be conducted in accordance with standard regulatory protocol.

Groundwater samples will be analyzed for:

- TPPH using EPA Method 8260B.
- BTEX using EPA Method 8260B
- MTBE, DIPE, ETBE, TAME, TBA, and ethanol using EPA Method 8260B.

A state-certified laboratory will perform all laboratory analyses. Chain of custody protocol will be followed for all samples, thus providing a continuous record of sample possession prior to actual analysis. Refer to Appendix C for a description of general field procedures.

Reports summarizing quarterly fluid level monitoring and groundwater sampling activities will be prepared and submitted on a quarterly basis.

5.0 COMPLETION SCHEDULE

Planned activities will be performed according to the following schedule:

- Conduct well abandonment activities – July 6 and 7, 2005
- Site demolition/UST removal/excavation activities – July through August, 2005
- Install proposed monitoring and vapor wells – August 2005
- Install and sample proposed soil gas probes – August 2005
- Prepare risk assessment – August 2005
- Conduct vapor extraction activities – September through December 2005
- Drill confirmation borings - January 2006
- Excavation of diesel / heavy end hydrocarbon-affected soil – January 2006

6.0 SITE SAFETY PLAN

A site safety plan designed to promote project personnel safety and preparedness during the proposed activities is included in Appendix D.

7.0 REFERENCES

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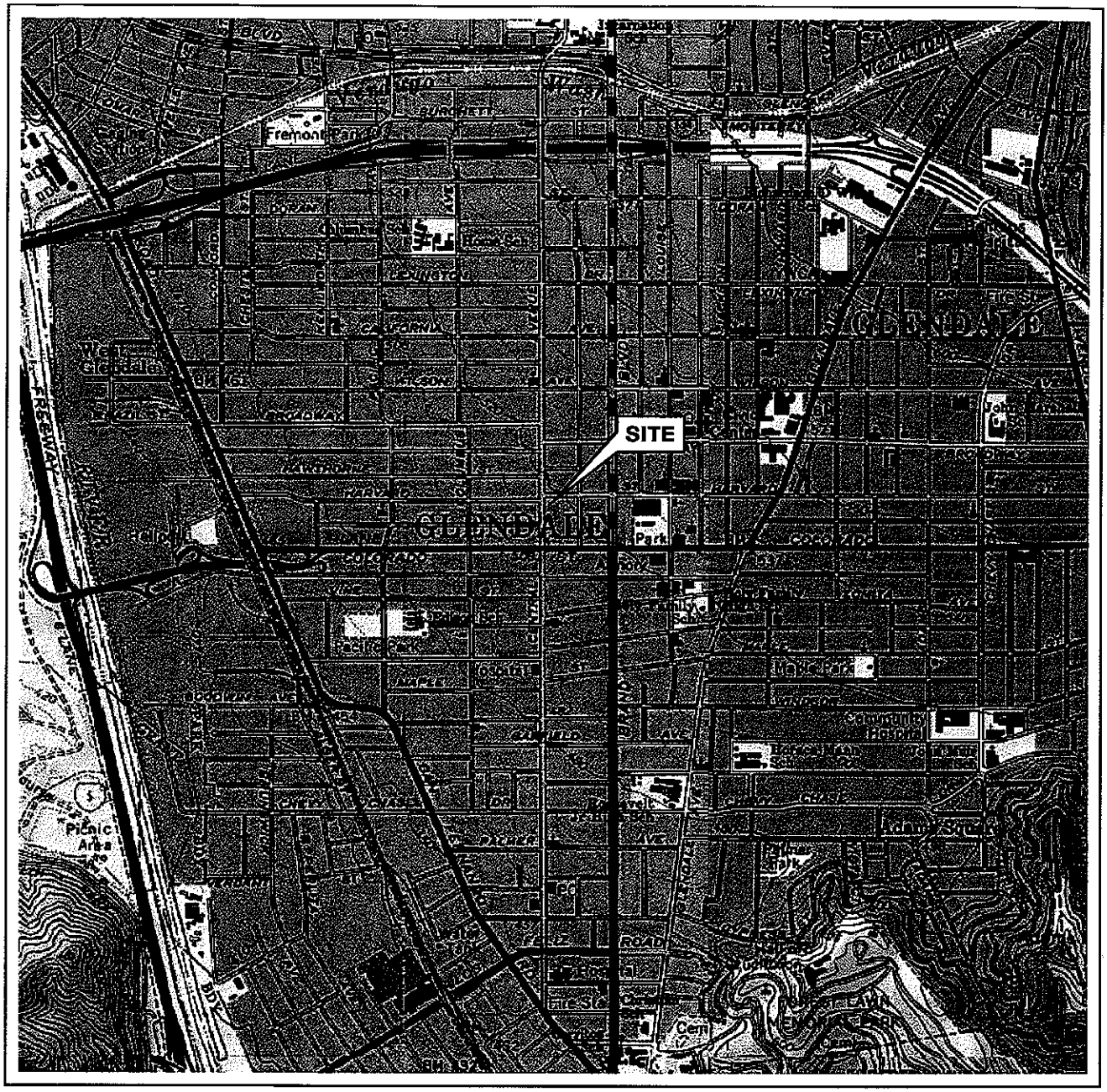
FIGURES



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SOURCE:

United States Geological Survey
7.5 Minute Topographic Map:
Pasadena Quadrangle

VICINITY MAP

76 Station 0353
200 South Central Avenue
Glendale, California

FIGURE 1

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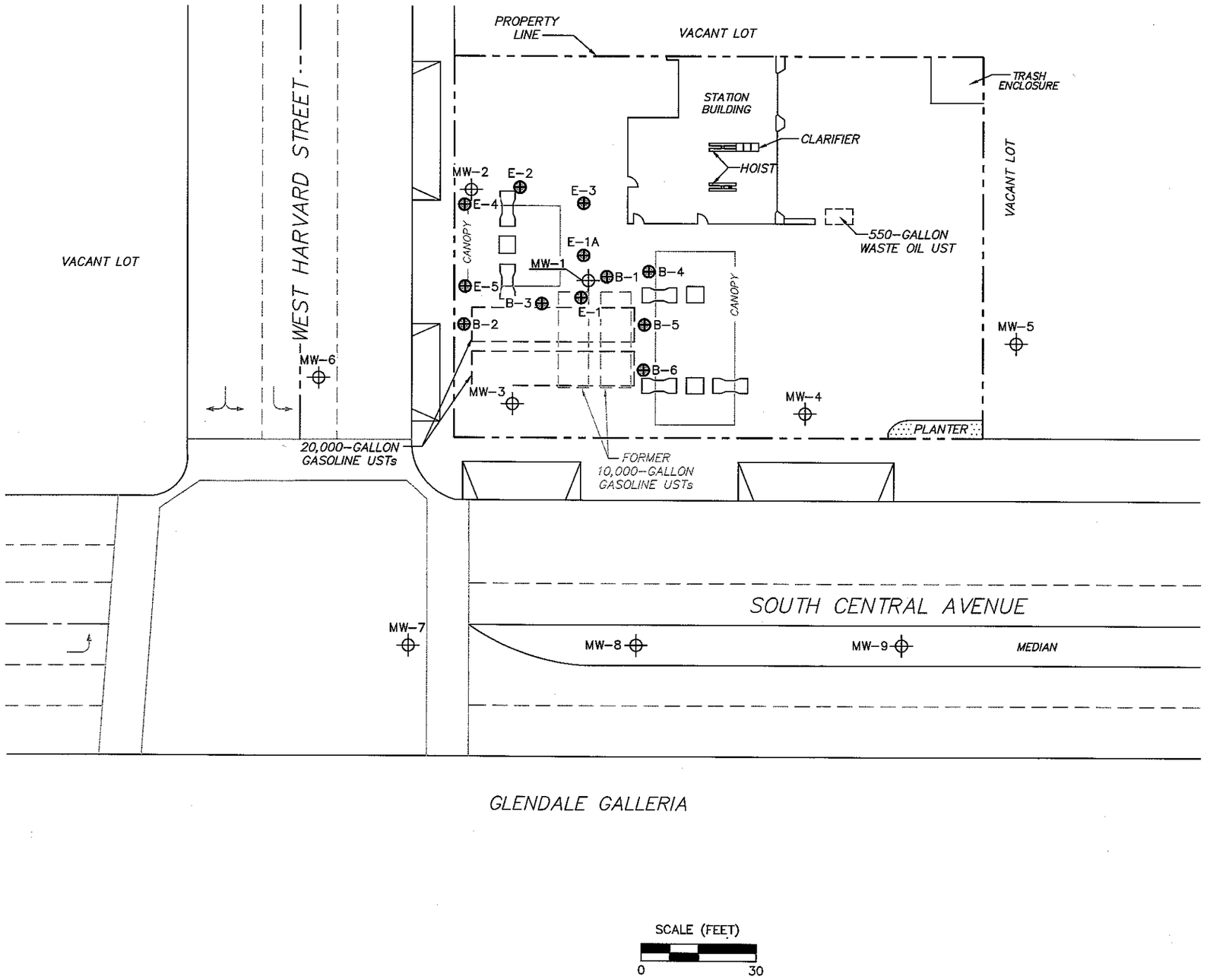

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LEGEND

MW-9 ⊕ Monitoring Well

B-6 ⊕ Boring

Dispenser Island

Canopy Support

NOTES:

Modified from a map provided by EP Associates, dated 01/05. UST = underground storage tank.

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SITE PLAN

Former 76 Station 0353
200 South Central Avenue
Glendale, California

TRC

FIGURE 2

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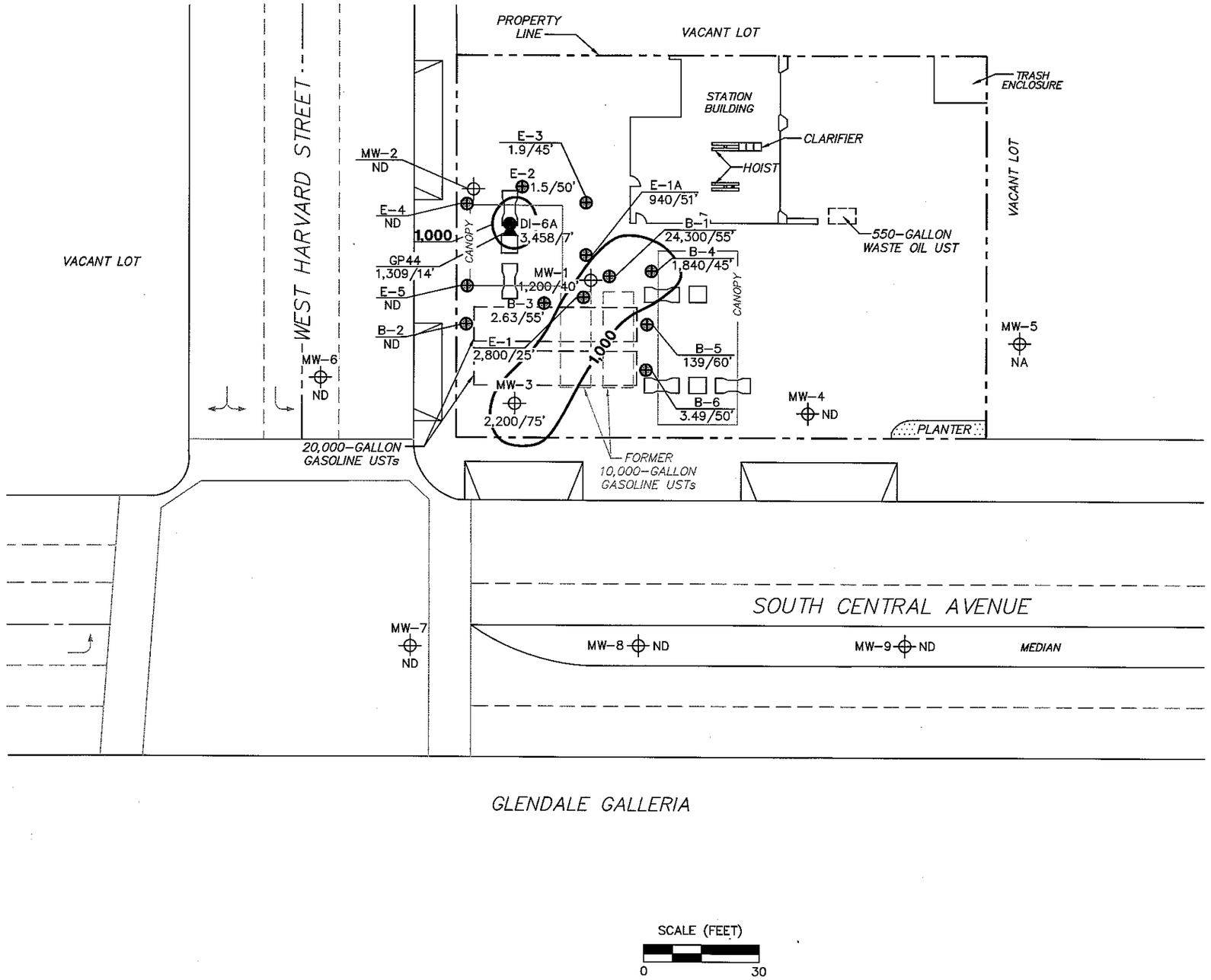

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LEGEND

- MW-9 ⊕ Monitoring Well with Adsorbed-Phase TPH-G Concentration (mg/kg) and Depth (fbg)
- B-6 ⊕ Boring with Adsorbed-Phase TPH-G Concentration (mg/kg) and Depth (fbg)
- GP44 ▲ Geoprobe Boring with Adsorbed-Phase TPH-G Concentration (mg/kg) and Depth (fbg)
- DI-6A ● Soil Sample with Adsorbed-Phase TPH-G Concentration (mg/kg) and Depth (fbg)
- —1,000— Adsorbed-Phase TPH-G Contour (mg/kg)
- Dispenser Island
- Canopy Support

NOTES:

Modified from a map provided by EP Associates, dated 01/05. TPH-G = total petroleum hydrocarbons as gasoline. mg/kg = milligrams per kilogram. UST = underground storage tank. NA = not analyzed, measured, or collected. ND = not detected. fbg = feet below grade.

MAXIMUM TPH-G CONCENTRATIONS IN SOIL

Former 76 Station 0353
200 South Central Avenue
Glendale, California

TRC

FIGURE 3

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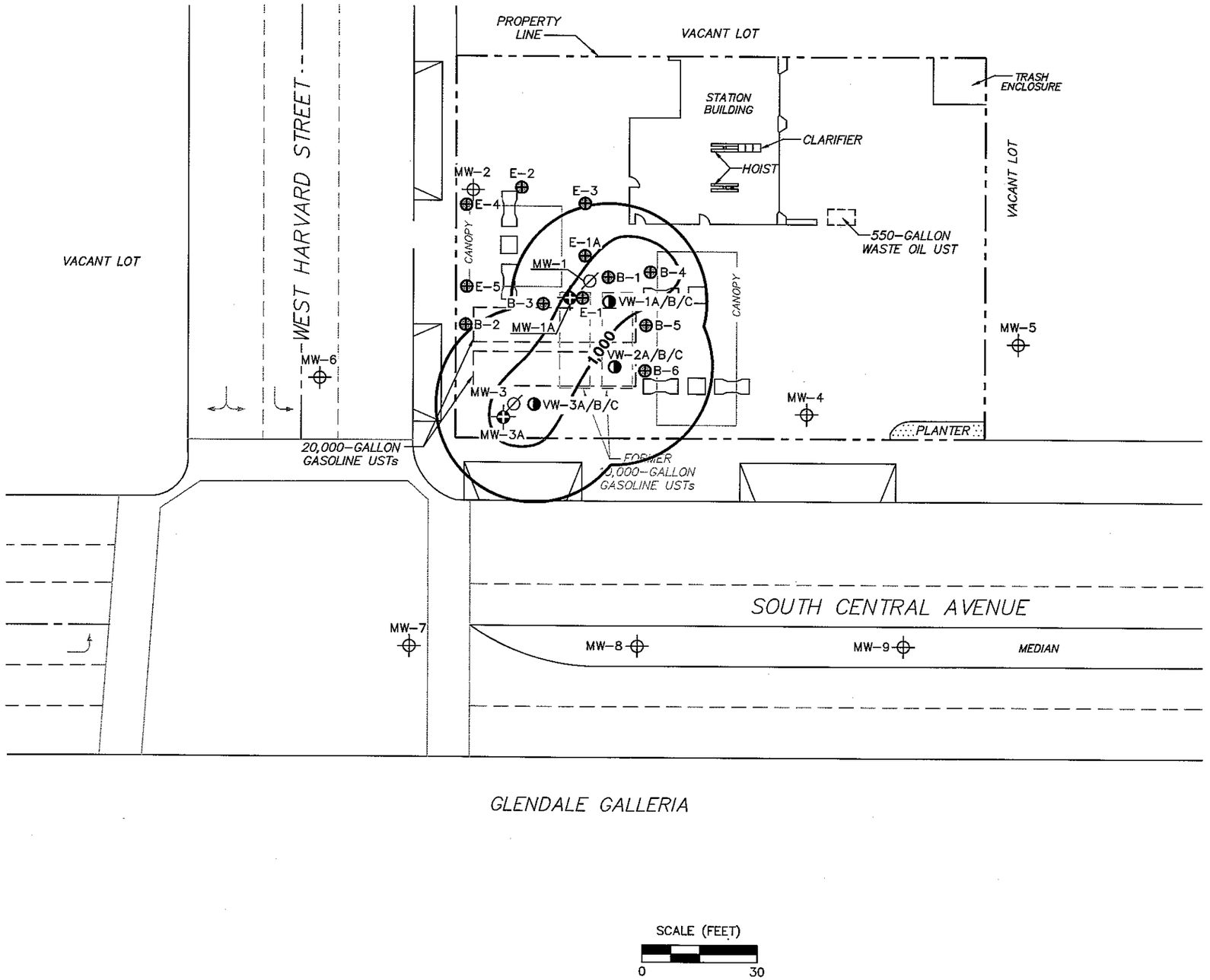

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LEGEND

- MW-3A — Proposed Monitoring Well
- VW-3A/B/C — Proposed Vapor Extraction Well
- MW-3 — Abandoned Monitoring Well
- MW-9 — Monitoring Well
- B-6 — Boring
- Dispenser Island
- Canopy Support
- 1,000 — Adsorbed-Phase TPH-G Contour (mg/kg)
- 25-Foot Radius of Influence for Vapor Extraction

NOTES:

Modified from a map provided by EP Associates, dated 01/05. UST = underground storage tank.
TPH-G = total petroleum hydrocarbons as gasoline.
mg/kg = milligrams per kilogram.
UST = underground storage tank.

PROPOSED MONITORING AND VAPOR EXTRACTION WELLS

Former 76 Station 0353
200 South Central Avenue
Glendale, California

TRC

FIGURE 4

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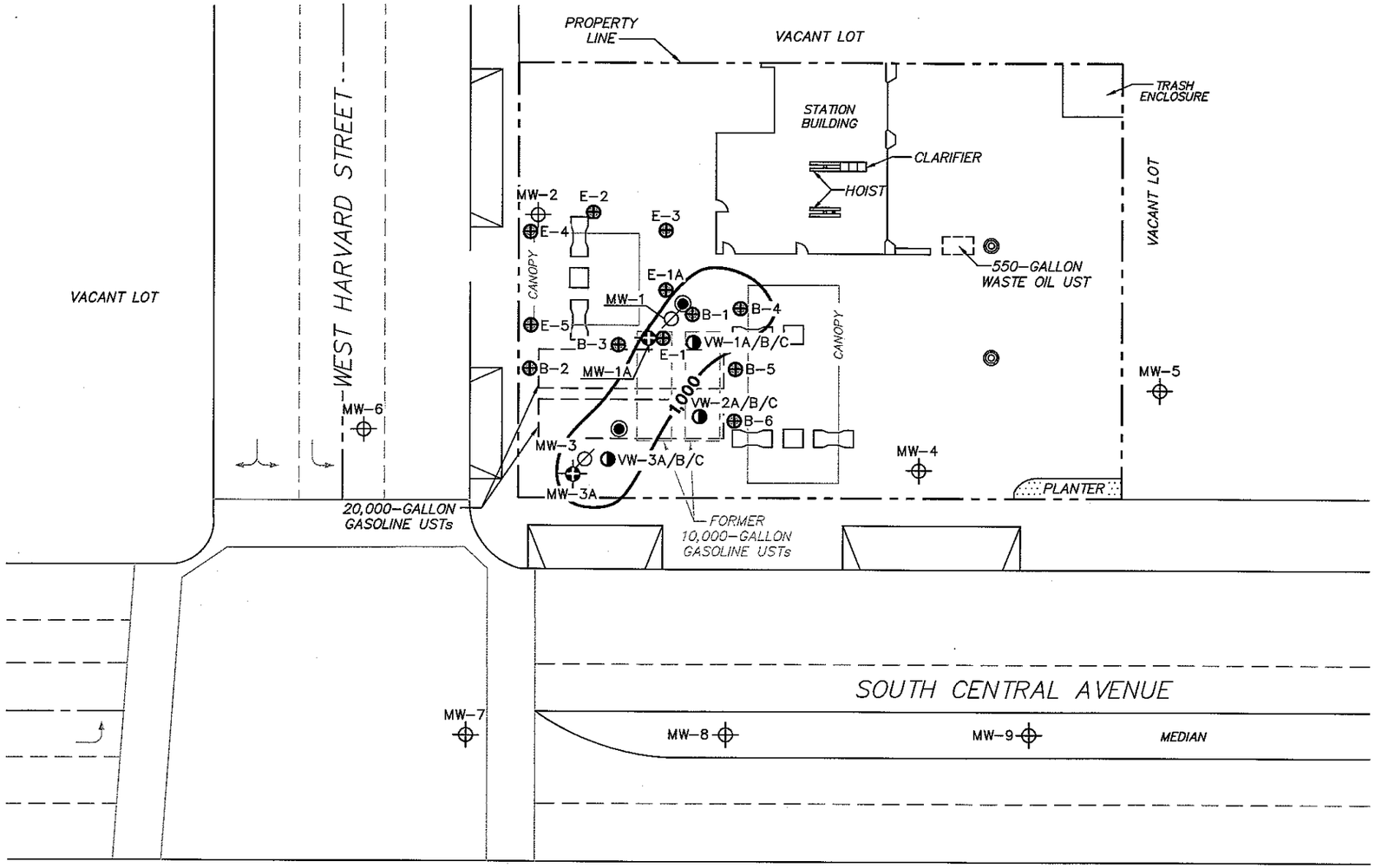

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LEGEND

- Proposed Soil Gas Probe
- Proposed Soil Gas Probe Cluster
- MW-3A — Proposed Monitoring Well
- VW-3A/B/C — Proposed Vapor Extraction Well
- MW-3 — Abandoned Monitoring Well
- MW-9 — Monitoring Well
- B-6 — Boring
- Dispenser Island
- Canopy Support
- 1,000 — Adsorbed-Phase TPH-G Contour (mg/kg)

NOTES:

Modified from a map provided by EP Associates, dated 01/05. UST = underground storage tank.
TPH-G = total petroleum hydrocarbons as gasoline.
mg/kg = milligrams per kilogram.
UST = underground storage tank.

PROPOSED SOIL GAS PROBES

Former 76 Station 0353
200 South Central Avenue
Glendale, California

TRC

FIGURE 5

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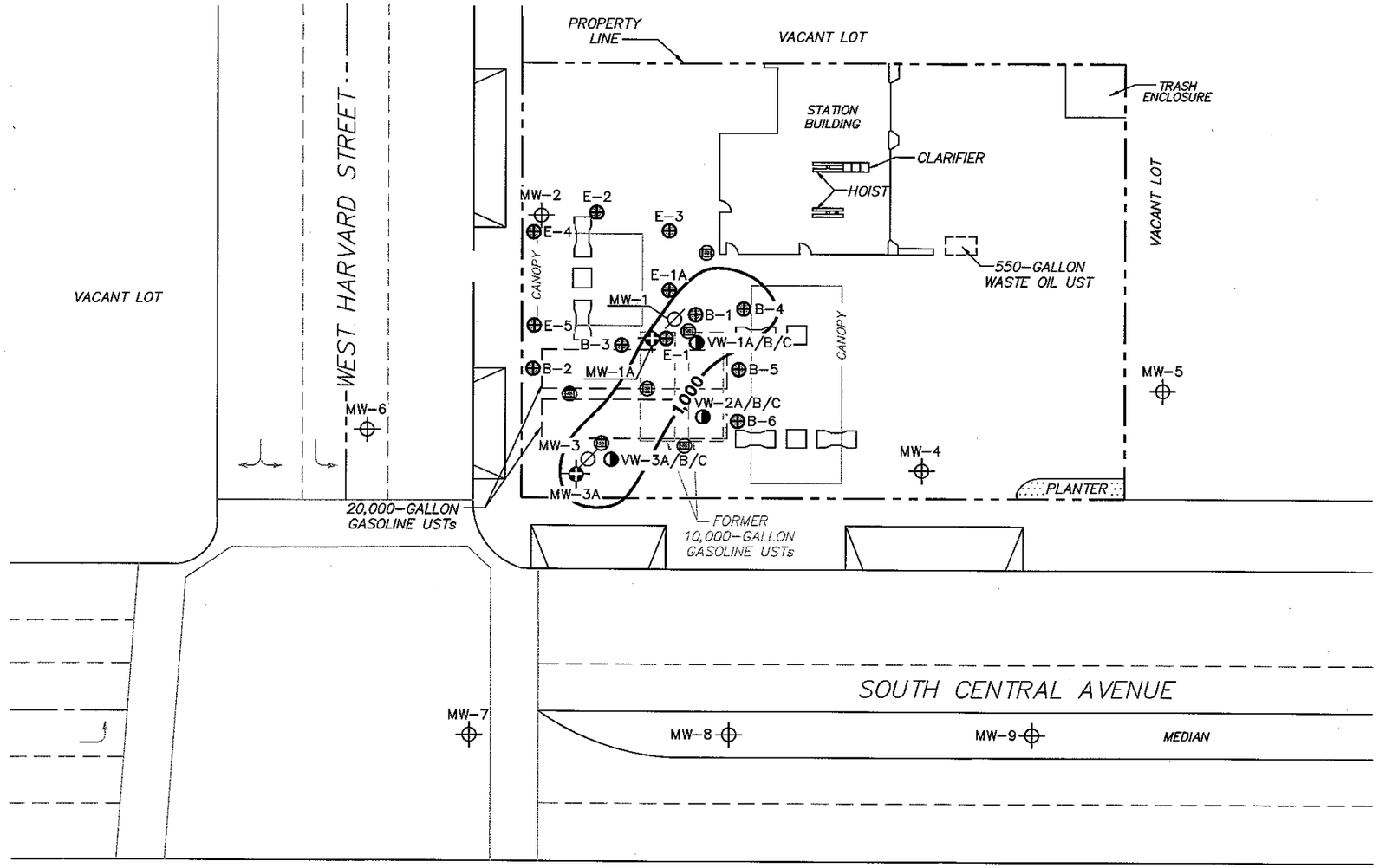

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LEGEND

- Proposed Confirmation Boring
- MW-3A — Proposed Monitoring Well
- VW-3A/B/C — Proposed Vapor Extraction Well
- MW-3 — Abandoned Monitoring Well
- MW-9 — Monitoring Well
- B-6 — Boring
- Dispenser Island
- Canopy Support
- 1,000 — Adsorbed-Phase TPH-G Contour (mg/kg)

NOTES:

Modified from a map provided by EP Associates, dated 01/05. UST = underground storage tank.
TPH-G = total petroleum hydrocarbons as gasoline.
mg/kg = milligrams per kilogram.
UST = underground storage tank.

PROPOSED CONFIRMATION BORINGS

Former 76 Station 0353
200 South Central Avenue
Glendale, California

TRC

FIGURE 6

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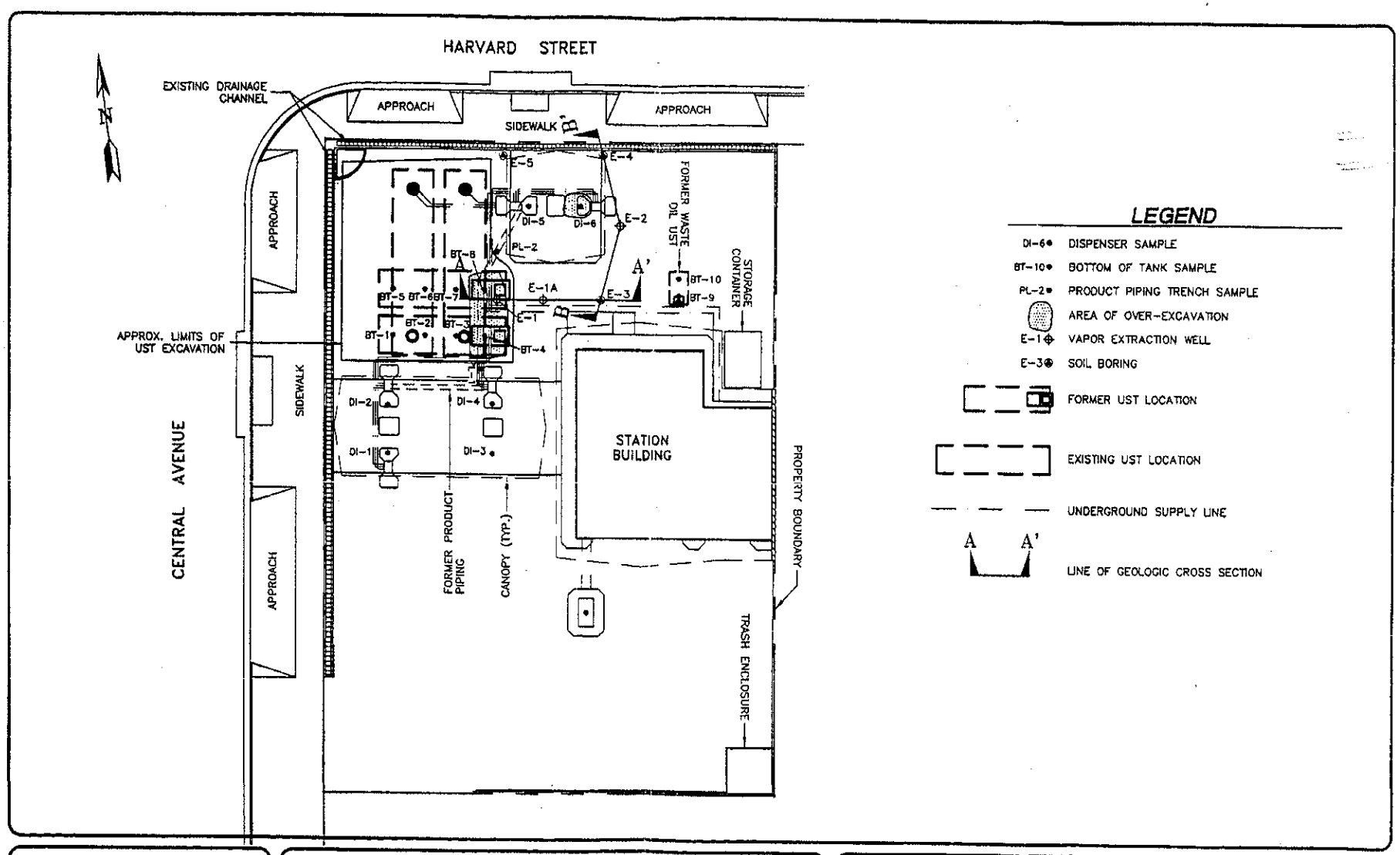
APPENDIX A

SELECTED TABLES AND FIGURES FROM PREVIOUS INVESTIGATIONS



EMCON

UNOCAL CORPORATION
SERVICE STATION 0353
200 SOUTH CENTRAL AVENUE
GLENDALE, CALIFORNIA

SITE PLAN

FIGURE 2

PROJECT NO. 0F30-009.003

CADD FILE: 00900302
DATE LAST REVISED: 05/08/96

TABLE 1
Summary of Tank Closure Soil Analytical Results

Unocal Station 0353
200 South Central Avenue
Glendale, California

Sample	Date Sampled	Sample Depth (Feet)	TPH (1) (mg/kg)	TRPH (2) (mg/kg)	Benzene(3) (mg/kg)	Toluene(3) (mg/kg)	Ethyl-benzene(3) (mg/kg)	Total Xylenes(3) (mg/kg)	Laboratory	Reference
BT-1	7/21/94	16'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-2	7/21/94	16'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-3	7/21/94	16'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-4	7/21/94	16'	998	--	0.810	2.199	2.969	64.410	Geochem	(A)
BT-4A	7/22/94	20'	ND(1)	--	ND(0.005)	0.006	0.007	0.059	Geochem	(A)
BT-5	7/21/94	16'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-6	7/21/94	16'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-7	7/21/94	16'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-8	7/21/94	16'	1,295	--	0.607	11.349	14.288	118.328	Geochem	(A)
BT-8A	7/22/94	20'	683	--	0.246	3.461	1.364	35.428	Geochem	(A)
BT-9	7/21/94	9'	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
BT-10	7/21/94	9'	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-1	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-2	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-3	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-4	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-5	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-6	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-7	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-8	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-9	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-10	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-11	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
CP-12	7/25/94	--	ND(1)	ND(1)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DI-1	7/21/94	3'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DI-2	7/21/94	3'	ND(1)	--	ND(0.005)	0.007	ND(0.005)	0.014	Geochem	(A)
DI-3	7/21/94	3'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DI-4	7/21/94	3'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DI-5	7/21/94	3'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DI-6	7/21/94	3'	4,562	--	8.224	152.585	61.790	335.310	Geochem	(A)
DI-6A	7/22/94	7'	3,458	--	4.369	89.957	44.988	223.988	Geochem	(A)
DP-1	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-2	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-3	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-4	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-5	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-6	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-7	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-8	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-9	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
DP-10	7/25/94	--	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
PL-1	7/21/94	5'	ND(1)	--	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	Geochem	(A)
PL-2	7/21/94	3'	ND(1)	--	ND(0.005)	0.009	ND(0.005)	0.011	Geochem	(A)

Abbreviations:
-- = not analyzed, or applicable
ND = none detected; detection limit shown in parenthesis.
Geochem = Geochem Environmental Laboratories.

Notes:
(1) TPH = Total Petroleum Hydrocarbons analyzed by modified U.S.EPA Method 8015.
(2) TRPH = Total Recovered Petroleum Hydrocarbons analyzed by EPA 418.1.
(3) Analyzed by EPA Method 8020.
(A) See attachments or appendices for Certified Analytical Reports.

QA/QC:_____

TABLE 2
Summary of Site Assessment Soil Analytical Results

Unocal Station No. 0353
200 South Central Avenue
Glendale, California

Sample Designation	Sample Depth (feet)	Sample Date	TPH-G (1) (mg/kg)	Benzene (2) (mg/kg)	Toluene (2) (mg/kg)	Ethyl-benzene (2) (mg/kg)	Xylenes (2) (mg/kg)	Total Lead (4) (mg/kg)
Exploratory Soil Borings								
E-1	15'	3/28/95	18	<0.005	<0.005	<0.005	<0.01	NA
	20'	3/28/95	2400	<1	1.2	3.6	31	NA
	25'	3/28/95	2800	<2	3.4	4.0	190	<10
E-1A	5'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	10'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	15'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	20'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	25'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	31.5'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	35'	3/29/95	<1	<0.005	0.022	0.015	0.22	NA
	40'	3/29/95	<1	<0.005	0.065	0.0058	0.068	NA
	45'	3/29/95	2.7	0.19	0.58	0.14	0.70	NA
	51'	3/29/95	940	2.9	36	25	150	<10
	55'	3/29/95	1.7	0.10	0.23	0.02	0.16	NA
	60'	3/29/95	<1	<0.005	0.015	<0.005	0.021	NA
	65'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	70'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	73.5'	3/29/95	<1	<0.005	<0.005	<0.005	<0.01	NA
E-2	5'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	10'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	15'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	20'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	28'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	30'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	35'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	40'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	45'	3/28/95	<1	0.008	0.018	0.011	0.074	NA
	50'	3/28/95	1.5	0.10	0.15	0.049	0.24	<10
	55'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	60'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	65'	3/28/95	<1	<0.005	<0.005	<0.005	<0.01	NA
E-3	5'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	10'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	15'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	20'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	25'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	30'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	35'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	40'	3/30/95	<1	0.0078	0.041	0.0077	0.054	NA
	45'	3/30/95	1.9	0.11	0.24	0.1	0.46	<10
	50'	3/30/95	<1	0.042	0.13	0.021	0.12	NA
	55'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	60'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	65'	3/30/95	<1	<0.005	0.008	<0.005	0.019	NA
	70'	3/30/95	<1	<0.005	0.006	<0.005	0.014	NA

TABLE 2
Summary of Site Assessment Soil Analytical Results

Unocal Station No. 0353
200 South Central Avenue
Glendale, California

Sample Designation	Sample Depth (feet)	Sample Date	TPH-G (1) (mg/kg)	Benzene (2) (mg/kg)	Toluene (2) (mg/kg)	Ethyl-benzene (2) (mg/kg)	Xylenes (2) (mg/kg)	Total Lead (4) (mg/kg)
E-4	5'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	10'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	15'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	20'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	25'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	30'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	35'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	40'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	45'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	50'	3/31/95	<1	<0.005	<0.005	<0.005	<0.01	<10
E-5	5'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	10'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	15'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	20'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	25'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	35'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	40'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	45'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	50'	3/30/95	<1	<0.005	**0.007**	<0.005	<0.005	NA
	55'	3/30/95	<1	<0.005	<0.005	<0.005	<0.005	NA
	60'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	65'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
	71'	3/30/95	<1	<0.005	<0.005	<0.005	<0.01	NA
Soil Screening Levels (a)			**10**	**0.001**	**0.1**	**0.68**	**1.75**	

Notes:

Detected concentrations are boldfaced, concentrations exceeding soil screening levels are highlighted.

(1) TPH-G = Total petroleum hydrocarbons as gasoline, analyzed using EPA Method 8015 Modified.

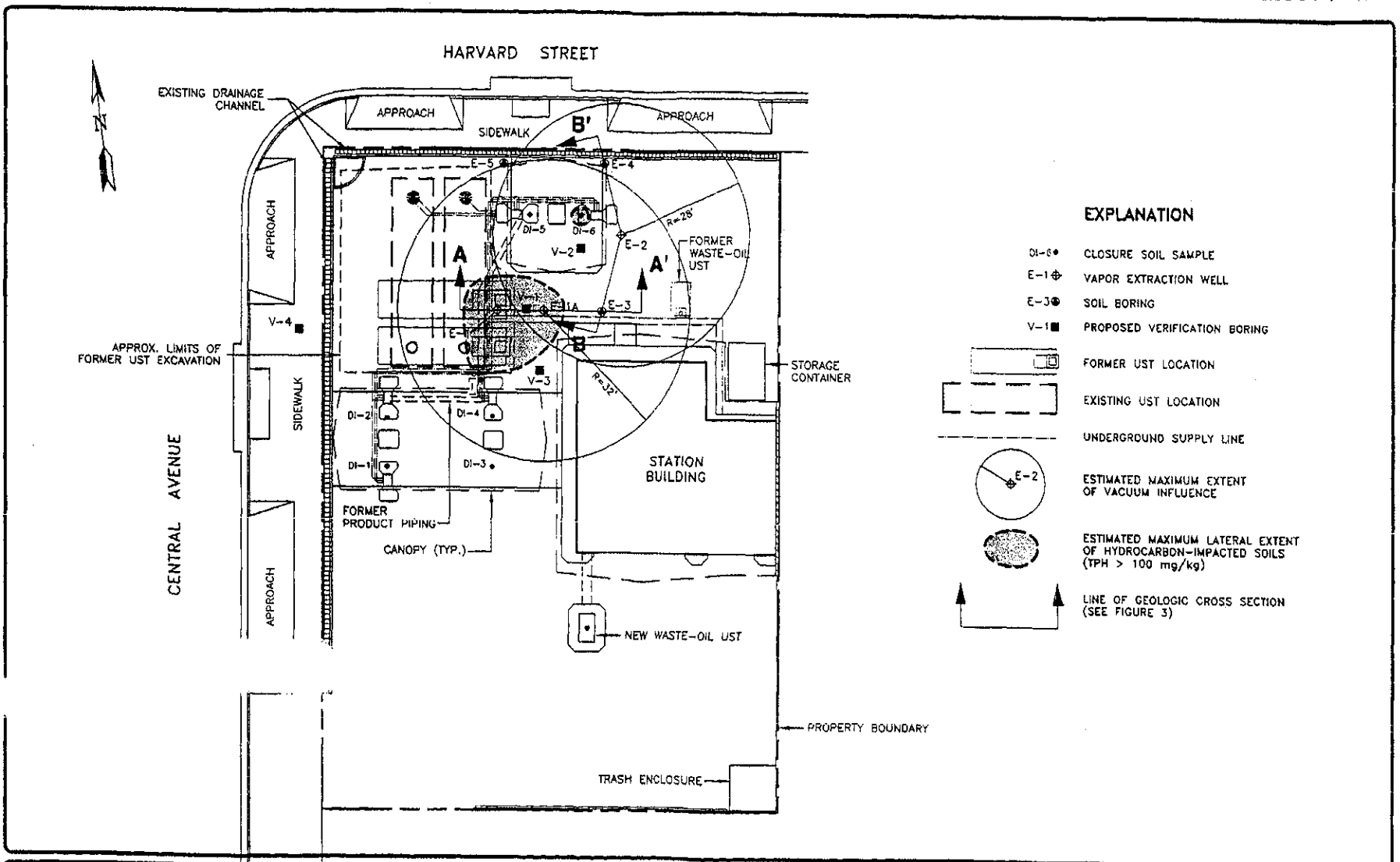
(2) Analyzed using EPA Method 8020.

(3) Analyzed using EPA Method 8015.

(4) Analyzed using EPA Method 7420.

mg/kg = milligrams per kilogram

(a) Based on Level A, Table 1 levels in Interim Guidance for Remediation of Petroleum Impacted Sites (RWQCB, November 1994)



EMCON

SCALE: 0 20 40 FEET

UNOCAL CORPORATION
UNOCAL SERVICE STATION 0353
200 SOUTH CENTRAL AVENUE
GLENDALE, CALIFORNIA

SITE PLAN

FIGURE NO. 2

PROJECT NO. 2357-561.01

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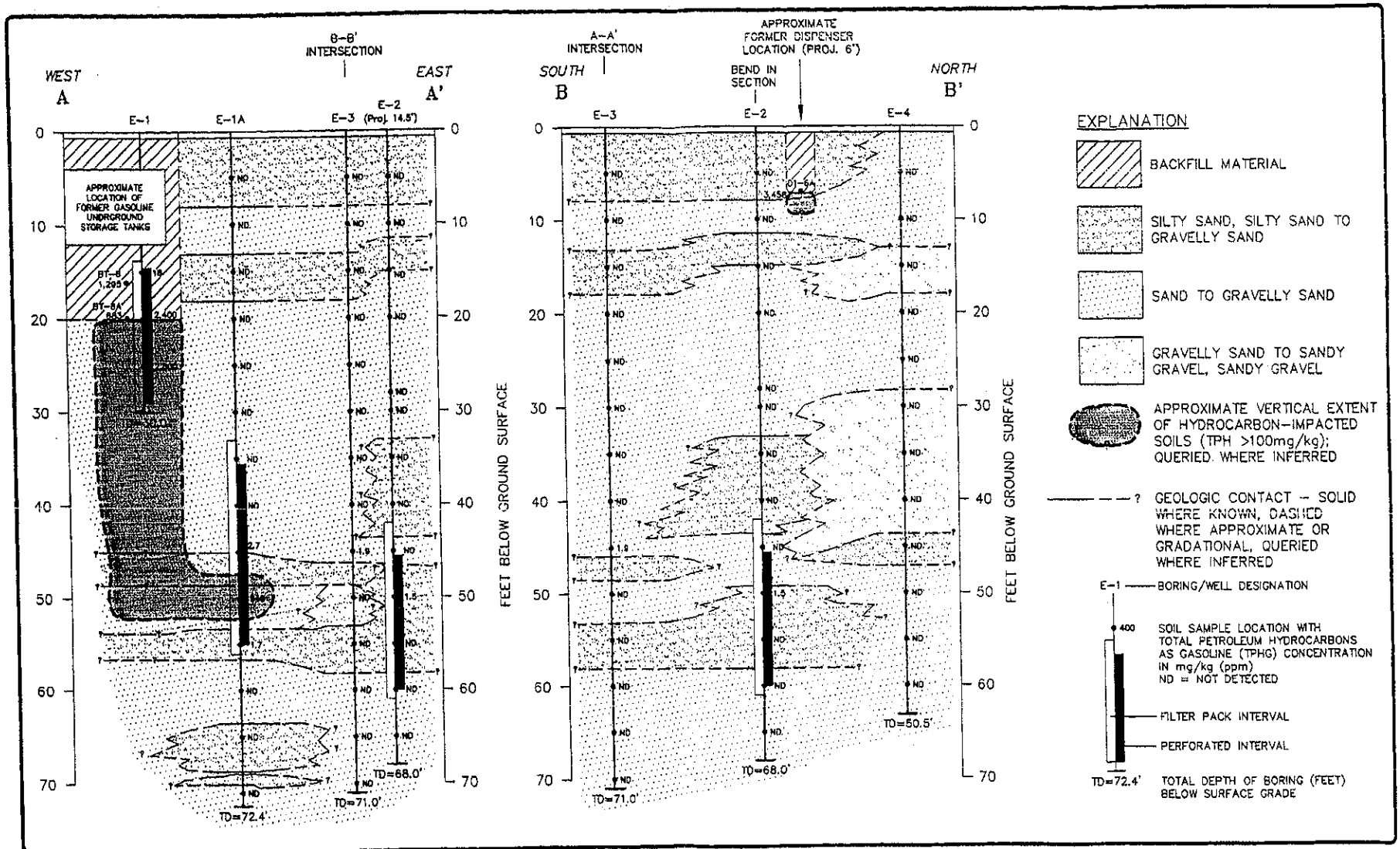

emcon

SCALE: 0 10 20 FEET

UNOCAL CORPORATION
UNOCAL SERVICE STATION 0353
200 SOUTH CENTRAL AVENUE
GLENDALE, CALIFORNIA

GEOLOGIC CROSS SECTION A-A' AND B-B'

FIGURE NO. 3

PROJECT NO. 2357-561.01

I:\2357-561\SECTIONS REV 0 11/28/95 11:35:39 KAJ

Summary of VET Results

Unocal Service Station
200 S. Central Ave.
Glendale, California

Extraction Well	E-1	E-1A	E-2	
Average Standard Vapor Extraction Rate (scfm):	24.8	19.8	39.5	
Average Source Vacuum (inch wc gauge):	2.1	3.3	13.0	
Estimated Average Total Petroleum Hydrocarbon Concentration in Extracted Vapor (ppmv):	2,700	19,000	6,100	
Estimated Average Benzene Concentration in Extracted Vapor (ppmv):	<0.2	430	110	
Extraction Time at Well (hr):	1.55	1.66	0.66	
MinimumTheoretical Radius of Vacuum Influence for Well (feet):	NA	30	27	
Maximum Theoretical Radius of Vacuum Influence for Well (feet):	NA	32	28	
Oxygen Content (%):	9.0	2.0	6.0	
Estimated Average Hydrocarbon Extraction Rate During Test (lb/hr):	1.0	5.7	3.60	
Estimated Average Benzene Extraction Rate During Test (lb/hr):	0.00	0.11	0.05	
Estimated Amount of Hydrocarbons Removed from Each Well During Test:				
TPHG (lb):	1.6	9.4	2.4	
	Total TPHG Removed During Testing =			13.4
Benzene (lb):	0.00	0.17	0.04	
	Total Benzene Removed During Testing =			0.21

CALCULATION SHEET 1

PROJECT TITLE: Unocal 0353 - 200 S. Central Ave. Glendale, CA PROJECT NO. OF30-009.03

DESCRIPTION: Soil Vapor Extraction Test Report Calculations SHEET 1 OF 6

PREPARED BY: CLB DATE: 5/3/95 CHECKED BY: AWL DATE: 8/14/95

VAPOR SAMPLE ANALYTICAL RESULTS (ppmv)

	Extraction Well E-1	Extraction Well E-1A	Extraction Well E-2
Total Hydrocarbons:	2,700	19,000	6,100
Benzene:	<0.2	430	110.0
Toluene:	17	2,500	400
Ethylbenzene:	26	370	65
Total Xylenes:	500	1,700	320
Oxygen (%)	9	2	6

ASSUMPTIONS:

1) The molecular weight of the extracted hydrocarbon vapor is approximately 95 lb/lb mole.

2) The vapor sample analytical results represent the average hydrocarbon concentration in the extracted vapor.

3) The molecular weight of the extracted benzene vapor is approximately 78.11 lb/lb mole.

NOTES:

1) The vapor extracted from Well E-1 was at an average vacuum of 2.1 w.c.g., average temperature of ~ 75 F, and average flow rate of 24.8 scfm. Vapor was extracted from the well for a total of ~ 1.55 hrs.

2) The vapor extracted from Well E-1A was at an average vacuum of 3.3 w.c.g., average temperature of ~ 74 F, and average flow rate of 19.8 scfm. Vapor was extracted from the well for a total of ~ 1.66 hrs.

3) The vapor extracted from Well E-2 was at an average vacuum of 13.0 w.c.g., average temperature of ~ 77 F, and average flow rate of 39.5 scfm. Vapor was extracted from the well for a total of ~ 0.66 hrs.

CALCULATION SHEET 2

PROJECT TITLE: Unocal 0353 - 200 S. Central Ave. Glendale, CA PROJECT NO. OF30-009.03

DESCRIPTION: Soil Vapor Extraction Test Report Calculations SHEET 2 OF 6

PREPARED BY: CLB DATE: 5/3/95 CHECKED BY: AVK DATE: 8/14/95

CALCULATIONS:

EXTRACTION WELL E-1

Average Normal Vapor Extraction Rate = 24.8 scfm

Average Total Hydrocarbon Extraction Rate = $\frac{(2.70E\text{-}03\ ft^3)}{(ft^3)} \frac{(lbmole)}{(379\ ft^3)} \frac{(95\ lb)}{(lb\ mole)} \frac{(24.8\ ft^3)}{(min)} \frac{(60\ min)}{(hr)}$

= 1.0 lb/hr

Amount of TPHG extracted from well during test = (1.0 lb/hr) (1.55 hr) = 1.6 lb

Average Benzene Extraction Rate = $\frac{(2.00E\text{-}07\ ft^3)}{(ft^3)} \frac{(lbmole)}{(379\ ft^3)} \frac{(78.11\ lb)}{(lb\ mole)} \frac{(24.8\ ft^3)}{(min)} \frac{(60\ min)}{(hr)}$

= 0.00 lb/hr

Amount of benzene extracted from well during test = (0.00 lb/hr) (1.55 hr) = 0.00 lb

CALCULATION SHEET 3

PROJECT TITLE: Unocal 0353 - 200 S. Central Ave. Glendale, CA PROJECT NO. OF30-009.03

DESCRIPTION: Soil Vapor Extraction Test Report Calculations SHEET 3 OF 6

PREPARED BY: CLB DATE: 5/3/95 CHECKED BY: AWK DATE: 8/14/95

CALCULATIONS:

EXTRACTION WELL E-1A

Average Normal Vapor Extraction Rate = 19.8 scfm

Average Total Hydrocarbon Extraction Rate

$$= \frac{(1.90\text{E-}02\ ft^3)}{(ft^3)} \frac{(lbmole)}{(379\ ft^3)} \frac{(95\ lb)}{(lb\ mole)} \frac{(19.8\ ft^3)}{(min)} \frac{(60\ min)}{(hr)}$$

$$= 5.7\ lb/hr$$

Amount of TPHG extracted from well during test = (5.7 lb/hr) (1.66 hr) = 9.4 lb

Average Benzene Extraction Rate

$$= \frac{(4.30\text{E-}04\ ft^3)}{(ft^3)} \frac{(lbmole)}{(379\ ft^3)} \frac{(78.11\ lb)}{(lb\ mole)} \frac{(19.8\ ft^3)}{(min)} \frac{(60\ min)}{(hr)}$$

$$= 0.11\ lb/hr$$

Amount of benzene extracted from well during test = (0.11 lb/hr) (1.66 hr) = 0.17 lb

CALCULATION SHEET 4

PROJECT TITLE: Unocal 0353 - 200 S. Central Ave. Glendale, CA PROJECT NO. OF30-009.03

DESCRIPTION: Soil Vapor Extraction Test Report Calculations SHEET 4 OF 6

PREPARED BY: CLB DATE: 5/3/95 CHECKED BY: AWL DATE: 8/14/95

CALCULATIONS:

EXTRACTION WELL E-2

Average Normal Vapor Extraction Rate = 39.5 scfm

Average Total Hydrocarbon Extraction Rate

$$= \frac{(6.10E\text{-}03\ ft^3)}{(ft^3)} \frac{(lbmole)}{(379\ ft^3)} \frac{(95\ lb)}{(lb\ mole)} \frac{(39.5\ ft^3)}{(min)} \frac{(60\ min)}{(hr)}$$

= 3.6 lb/hr

Amount of TPHG extracted from well during test = (3.6 lb/hr) (0.66 hr) = 2.4 lb

Average Benzene Extraction Rate

$$= \frac{(1.10E\text{-}04\ ft^3)}{(ft^3)} \frac{(lbmole)}{(379\ ft^3)} \frac{(78.11\ lb)}{(lb\ mole)} \frac{(39.5\ ft^3)}{(min)} \frac{(60\ min)}{(hr)}$$

= 0.05 lb/hr

Amount of benzene extracted from well during test = (0.05 lb/hr) (0.66 hr) = 0.04 lb

CALCULATION SHEET 5

PROJECT TITLE: Unocal 0353 - 200 S. Central Ave. Glendale, CA PROJECT NO. OF30-009.03

DESCRIPTION: Soil Vapor Extraction Test Report Calculations SHEET 5 OF 6

PREPARED BY: CLB DATE: 5/3/95 CHECKED BY: AVR DATE: 8/14/95

TOTAL AMOUNT OF HYDROCARBONS AND BENZENE EXTRACTED DURING TEST:

Estimated Amount of Total Hydrocarbons Extracted	= 1.6 lbs + 9.4 lbs + 2.4 lbs	=	13.4 lbs
Estimated Amount of Benzene Extracted	= 0.17 lbs + 0.04 lbs	=	0.21 lbs

EXTENT OF VACUUM INFLUENCE

An estimate for the extent of vacuum influence is obtained by fitting pressure distribution data from the vapor extraction test to the steady - state radial pressure distribution equation:

$$P(R) = Pw \left[1 + \left(1 - \left(\frac{1 - Patm}{Pw} \right) 2 \right) \frac{\ln (r / Rw)}{\ln (Rw / RI)} \right] 1/2$$

P(R) = the absolute pressure measured at a distance r from the extraction well

r = the distance between the extraction well and the observation well

Patm = the absolute ambient pressure (assumed to be ~14.7 psia)

Pw = the absolute pressure applied at the vapor extraction well

Rw = the radius of the extraction well, in feet

RI = the radius of vacuum influence, in feet

CALCULATION SHEET 6

PROJECT TITLE: Unocal 0353 - 200 S. Central Ave. Glendale, CA PROJECT NO. OF30-009.03

DESCRIPTION: Soil Vapor Extraction Test Report Calculations SHEET 6 OF 6

PREPARED BY: CLB DATE: 5/3/95 CHECKED BY: AVL DATE: 8/14/95

Extraction Well E-1A

Theoretical extent of vacuum influence at Well E-2

P(R) = 0.170 " w.c.g. = 14.69 psia

r = 22.5 feet

Patm = 14.70 psia

Pw = 3.3 " w.c.g. = 14.58 psia

Rw = 1 inch = 0.083 feet

$$14.69 \text{ psia} = 14.58 \text{ psia} \left[1 + \left(1 - \left(\frac{14.70}{14.58} \right)^2 \right) \frac{\ln\left(22.5 / 0.083 \right)}{\ln\left(0.083 / RI \right)} \right]^{1/2}$$

Solving the above equation, RI = 30 feet

Extraction Well E-2

Theoretical extent of vacuum influence at Well E-1A

P(R) = 0.410 " w.c.g. = 14.69 psia

r = 22.5 feet

Patm = 14.70 psia

Pw = 13 " w.c.g. = 14.23 psia

Rw = 1 inch = 0.083 feet

$$14.69 \text{ psia} = 14.23 \text{ psia} \left[1 + \left(1 - \left(\frac{14.70}{14.23} \right)^2 \right) \frac{\ln\left(22.5 / 0.083 \right)}{\ln\left(0.083 / RI \right)} \right]^{1/2}$$

Solving the above equation, RI = 27 feet

VAPOR EXTRACTION TEST FIELD DATA
EMCON - BURBANK
VAPOR EXTRACTION WELL E-1

TEST DATE: 4/19/95
CLIENT: UNOCAL
STATION NUMBER: 353
SITE LOCATION 200 S. Central Ave.
Glendale, California
EXTRACTION WELL E-1
START TIME: 7:33

SYSTEM OPERATOR(S): Chris Bonds\David G.
ICE SERIAL NO. V3 S/N 70

																	AVG
TIME MONITORED:	7:40	7:52	7:55	8:00	8:05	8:10	8:15	8:20	8:25	8:30	8:35	8:42	8:45	8:50	8:55	9:00	1.55 hrs
TIME INTERVAL BETWEEN MEASUREMENT:	7	12	3	5	5	5	5	5	5	5	5	7	3	5	5	5	
APPLIED VACUUM (INCH W.C.):	2.7	0.7	0.7	0.7	0.8	0.8	1.6	1.5	1.6	1.6	1.6	3.6	3.8	3.8	4.1	4.2	2.1
VAPOR TEMP. (F):	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
VAPOR EXTRACTION RATE (SCFM):	30.9	9.5	10.7	11.0	11.0	10.8	21.2	20.5	21.1	21.1	21.1	42.0	42.0	42.3	43.0	44.0	24.8
MONITORING WELL NO.:																	
E-1A	0.10	0.05	0.05	0.04	0.05	0.05	0.06	0.07	0.07	0.07	0.08	0.11	0.13	0.14	0.13	0.15	
E-2	0.05	0.04	0.05	0.05	0.06	0.06	0.06	0.06	0.08	0.08	0.08	0.12	0.12	0.14	0.16	0.17	
PID (ppmv)	2342					>2500					>2500					>2500	

VAPOR EXTRACTION TEST FIELD DATA
EMCON - BURBANK
VAPOR EXTRACTION WELL E-1A

TEST DATE: 4/19/95
CLIENT: UNOCAL
STATION NO: 353
SITE LOCATION 200 S. Central Ave.
Glendale, California
EXTRACTION WELL E-1A
START TIME: 9:20

SYSTEM OPERATOR(S): Chris Bonds\David G.
ICE SERIAL NO. V3 S/N 70

																				AVG
TIME MONITORED:	9:25	9:30	9:35	9:40	9:45	9:50	9:55	10:00	10:05	10:10	10:15	10:20	10:25	10:30	10:35	10:40	10:45	10:50	10:55	11:00	1.66 hrs
TIME INTERVAL BETWEEN MEASUREMENT:		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
APPLIED VAC. (INCH W.C.):	4.75	4.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.3	3.25	3.25	3.3	3.3	4.9	5	5	5	5.1	5.1	3.3
VAPOR TEMP. (F):	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
EXTRACTION RATE (SCFM):	27.5	28.0	9.8	9.5	9.7	9.6	9.6	9.8	9.8	20.6	20.3	20.1	20.2	20.1	29.0	30.7	30.0	29.5	29.6	30.3	19.8
MONITORING WELL NO.:																					
E-1	0.06	0.06	0.02	0.02	0.00	0.00	0.00	0.01	0.02	0.04	0.03	0.04	0.04	0.05	0.07	0.06	0.07	0.07	0.07	0.05	
E-2	0.35	0.35	0.22	0.18	0.17	0.13	0.10	0.08	0.08	0.14	0.16	0.16	0.16	0.17	0.25	0.28	0.29	0.30	0.32	0.32	
PID (ppmv)		>2500							>2500					>2500						>2500	

VAPOR EXTRACTION TEST FIELD DATA
EMCON - BURBANK
VAPOR EXTRACTION WELL E-2

TEST DATE: 4/19/95
CLIENT: UNOCAL
STATION NUMBER: 353
SITE LOCATION 200 S. Central Ave.
Glendale, California
EXTRACTION WELL E-2
START TIME: 11:15

SYSTEM OPERATOR(S): Chris Bonds\David G.
ICE SERIAL NO. V3 S/N 70

									AVG
TIME MONITORED:	11:22	11:25	11:30	11:35	11:40	11:45	11:50	11:55	0.66 hrs
TIME INTERVAL BETWEEN MEASUREMENT:		3	5	5	5	5	5	5	
APPLIED VACUUM (INCH W.C.):	13	13	13	13	13	13	13	13	13.0
VAPOR TEMP. (F):	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8	77
VAPOR EXTRACTION RATE (SCFM):	41.4	39.0	38.9	40.0	38.3	39.5	40.7	40.0	39.5
MONITORING WELL NO.:									
E-1	0.01	0.03	0.03	0.01	0.02	0.02	0.03	0.02	
E-1A	0.36	0.38	0.38	0.39	0.39	0.41	0.41	0.41	
PID (ppmv)		>2500			>2500			>2500	

Vapor Extraction Test - 2/3 maximum vacuum
Well E-1A
Average Applied Vacuum = 3.3 " wc

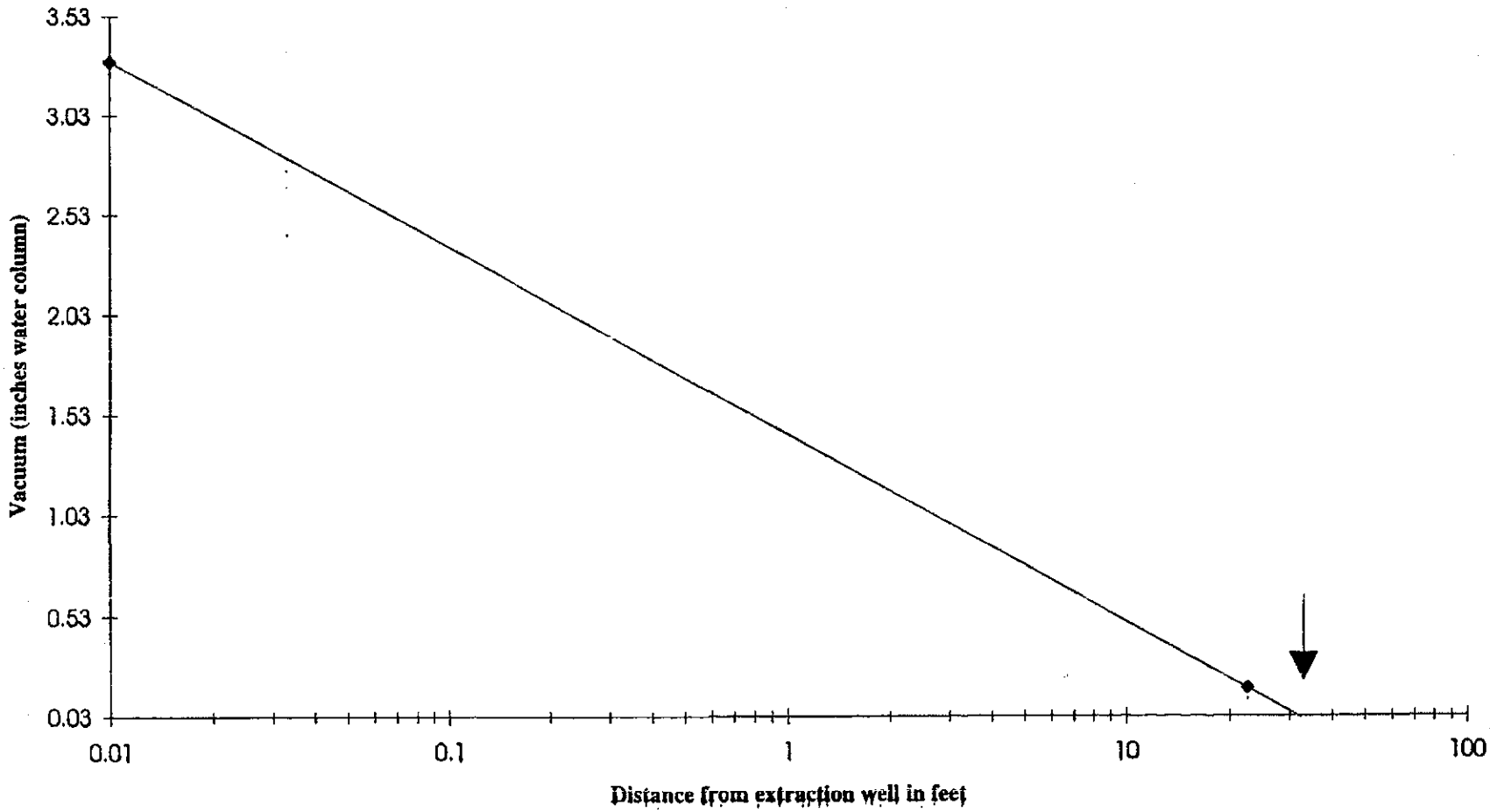

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Chart 1

Vapor Extraction Test - 2/3 maximum vacuum
Well E-2
Average Applied Vacuum = 13 " wc

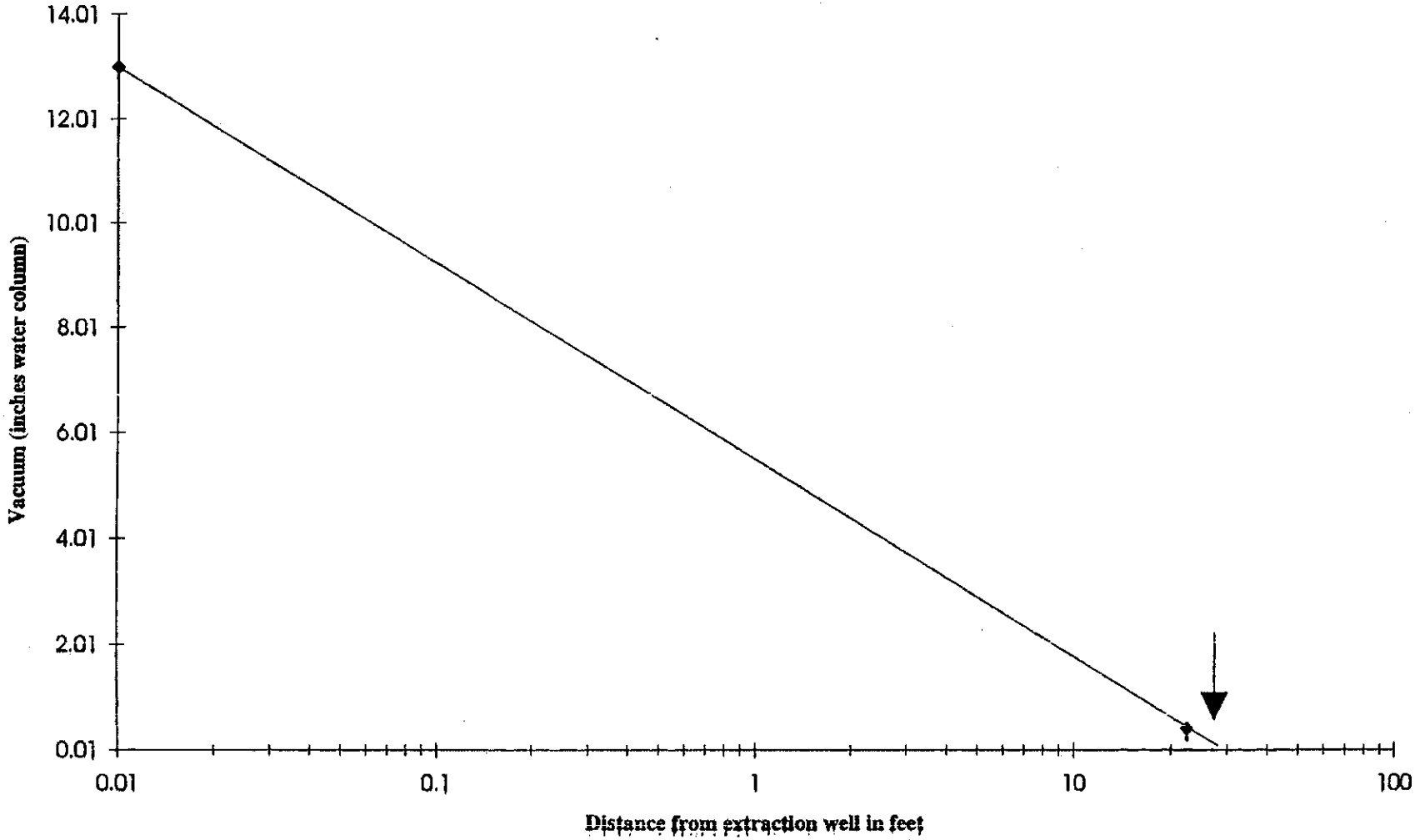

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Chart 2

FIGURE 10 - PLUMES P20-P27

200 SOUTH CENTRAL AVENUE
(UNOCAL SERVICE STATION)